

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended) A process that includes the steps of:

(a) producing molten steel and molten steelmaking process in a steelmaking vessel, the steelmaking slag including iron units and flux units; and

(b) producing molten iron in a direct smelting process in a direct smelting vessel containing a molten bath of iron and iron-making slag by supplying iron ore or pre-treated iron ore and carbonaceous material to the direct smelting vessel as a part of the feed material requirements of the direct smelting process and using a substantial portion of the steelmaking slag from step (a) as another part of the feed material requirements for the direct smelting process, and controlling the direct smelting process to smelt ferrous feed material and substantially partition phosphorus to the iron-making slag and smelting the iron ore or pre-treated iron ore and iron units to produce molten iron,

wherein the direct smelting process includes using a slag forming agent to provide flux units in addition to the flux units provided by the steelmaking slag, injecting the slag forming agent directly into the direct smelting vessel as opposed to pre-treating the slag forming agent before injection into the vessel as is the case with the steelmaking slag.

2. (currently amended) The process defined in claim 1 wherein step (b) includes using at least 70% by weight of the steelmaking slag as said another part of the feed material requirements for the direct smelting process.

3. (currently amended) The process defined in claim 1 wherein step (b) includes using at least 80% by weight of the steelmaking slag as said another part of the feed material requirements for the direct smelting process.

4. (currently amended) The process defined in claim 1 wherein step (b) includes using at least 90% by weight of the steelmaking slag as said another part of the feed material requirements for the direct smelting process.

5. (previously presented) The process defined in claim 1 wherein step (b) includes using sufficient steelmaking slag to provide at least 50% by weight of the flux units of the feed material requirements of the direct smelting process.

6. (previously presented) The process defined in claim 1 wherein the process is an integrated steelmaking process and includes producing molten iron in at least one ironmaking vessel and supplying the molten iron as a ferrous feed material for step (a).

7. (previously presented) The process defined in claim 1 further including using iron produced in step (b) as at least part of the ferrous feed material for producing steel in step (a).

8. (previously presented) The process defined in claim 1 further including using iron produced in step (b) and in at least one other ironmaking vessel as the ferrous feed material for producing steel in step (a).

Claim 9. (cancelled)

10. (previously presented) The process defined in claim 1 wherein the direct smelting process is a molten bath-based process in which solid feed materials are injected significantly deeper into the molten bath.

11. (previously presented) The process defined in claim 1 further including pre-treating ferrous feed material including the steelmaking slag containing iron and flux units for step (b) by at least heating the ferrous feed material in a pre-treatment unit.

12. (previously presented) The process defined in claim 11 wherein the pre-treatment step includes preheating the ferrous feed material to at least 400°C.

13. (original) The process defined in claim 12 wherein the pre-treatment step includes preheating the ferrous feed material to at least 700°C.

14. (previously presented) The process defined in claim 11 wherein the pre-treatment step includes preheating the ferrous feed material to a temperature less than 1050°C.

15. (previously presented) The process defined in claim 11 wherein the pre-treatment step includes preheating the ferrous feed material to a temperature less than 900°C.

16. (previously presented) The process defined in claim 11 wherein the pre-treatment step includes wet scrubbing an offgas produced in the step and using wet sludge containing steelmaking slag in the process.

Claims 17-18. (cancelled)

19. (previously presented) The process defined in claim 1 wherein an amount of slag forming agent injected directly into the direct smelting vessel is sufficient to provide up to 30% by weight of the flux requirements.

20. (previously presented) The process defined in claim 19 wherein the slag forming agent includes calcium oxide.

21. (previously presented) The process defined in claim 1, further including cooling the steelmaking slag produced in step (a) prior to using at least a portion of the steelmaking slag in step (b).

22. (previously presented) The process defined in claim 21 further including reducing the size of the cooled steelmaking slag prior to adding the steelmaking slag in step (b).

Claim 23. (cancelled)

24. (currently amended) A direct smelting process for producing molten iron in a direct smelting vessel containing a molten bath of iron and iron-making slag, the process including the steps of:

(a) pre-treating ferrous feed material including steelmaking slag containing iron and flux units in a pre-treatment unit by at least heating and at least partially reducing the ferrous feed material; and

(b) direct smelting molten iron in a direct smelting vessel containing a molten bath of iron and iron-making slag by supplying iron ore or pre-treated iron ore and carbonaceous material to the direct smelting vessel as a part of the feed material requirements of the direct smelting process and using a substantial portion of the pre-treated ferrous feed material including steelmaking slag from step (a) as another part of the feed material requirements for the direct smelting vessel process, and controlling the direct smelting process to smelt ferrous feed material and substantially partition phosphorus to the iron-making slag and smelting the iron ore or pre-treated iron ore and iron units to produce molten iron using a slag forming agent to provide flux units in addition to flux units provided by the steelmaking slag and injecting the slag forming agent directly into the direct smelting vessel as opposed to pretreating the slag forming agent before injection into the vessel as is the case with the steelmaking slag.

Claim 25. (cancelled)

26. (previously presented) The process defined in claim 24 wherein step (a) includes heating the ferrous feed material to at least 400°C.

27. (previously presented) The process defined in claim 24 wherein step (a) includes heating the ferrous feed material to at least 700°C.

28. (previously presented) The process defined in claim 24 wherein step (a) includes preheating the ferrous feed material to a temperature less than 1050°C.

29. (previously presented) The process defined in claim 24 wherein step (a) includes preheating the ferrous feed material to a temperature less than 900°C.

30. (previously presented) The process defined in claim 24 wherein step (a) includes wet scrubbing an offgas produced in the step and using wet sludge containing steelmaking slag in the process.

Claims 31-32. (cancelled)

33. (previously presented) The process defined in claim 24 wherein an amount of slag forming agent injected directly into the direct smelting vessel is sufficient to provide up to 30% by weight of the flux requirements.

34. (previously presented) The process defined in claim 24 wherein an additional slag forming agent includes calcium oxide.

Claim 35. (cancelled)

36. (previously presented) The process defined in claim 24 wherein step (b) includes controlling conditions within the direct smelting vessel to partition phosphorus to the slag by maintaining the slag in an oxidising condition whereby the partition ratio of phosphorus in the iron to phosphorus in the slag is at least 1:5.

37. (previously presented) The process defined in claim 24 wherein step (b) includes controlling conditions within the direct smelting vessel to partition phosphorus

to the slag by maintaining the slag temperature to be in the range of 1350-1450°C and the amount of FeO in the slag to be at least 3% by weight.

Claims 38-39. (cancelled).